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20985 7590 07/13/2007 FISH & RICHARDSON, PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER LEE, SHUN K	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/776,645	KINDEM ET AL.	
	Examiner	Art Unit	
	Shun Lee	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2007 and 08 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 9, 11-14, 16-26, 29 and 32-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9, 11-14, 16-26, 29 and 32-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9 April 2007 has been entered.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 3, 5, 6, 11, 36, 45, and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of O'Kane Sr. *et al.* (US 2002/0060300).

It should be noted that US Patent 6,894,282 B2 (Freund *et al.*) corresponds to WO 02/25311 A1 (Freund *et al.*).

In regard to claim 1, Freund *et al.* disclose (Figs. 5 and 6) a scintillator assembly, comprising:

- (a) an array of scintillator material comprising plural pixels (4) of separated scintillator material, each having outer surfaces of a first shape, and a bridge (*i.e.*, "base plate"; US 6,894,282 column 4, lines 57-66) holding together the plural separated pixels (4) in a specific geometry; and
- (b) a preformed reflector (5), further comprising titanium dioxide as an additive to the reflector material (US 6,894,282 column 4, lines 10-16), having plural inner surfaces which each mate with said array of plural separated pixels (4), to contain each of said pixels (4) of scintillator material at least partly within said pre-formed reflector (5).

The assembly of Freund *et al.* lacks an explicit description that the plastic reflector comprises polyethylene. However, Freund *et al.* also disclose (US 6,894,282 column 2,

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lines 58-65) a plastic reflector. Since Freund *et al.* do not disclose and/or require a specific plastic, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified plastic of Freund *et al.* as any one of the known conventional plastics that would not require further description. Further, O'Kane Sr. *et al.* teach (paragraphs 46-49) that plastics comprise polyethylene. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention that the unspecified plastic reflector material in the assembly of Freund *et al.* comprises a known plastic material (e.g., polyethylene).

In regard to claim 3 which is dependent on claim 1, Freund *et al.* also disclose (US 6,894,282 column 4, line 66 to column 5, line 10) an adhesive material, bonding said scintillator material within said pre-formed reflector.

In regard to claims 5 and 6 which are dependent on claim 1, Freund *et al.* also disclose (Figs. 5 and 6) an opening in the preformed reflector (5), at a specified location, corresponding to a specified location on the scintillator material, wherein said opening is at a location of an exit window on the scintillator material.

In regard to claim 11 which is dependent on claim 1, Freund *et al.* also disclose (Figs. 5 and 6) a plurality of openings in the pre-formed reflector (5), at locations of a plurality of exit faces for the scintillator material.

In regard to claim 36 which is dependent on claim 1, Freund *et al.* also disclose (US 6,894,282 column 4, lines 10-16) that said preformed reflector is formed by injection molding.

In regard to claim **45** which is dependent on claim 1, Freund *et al.* also disclose (Figs. 5 and 6) that the preformed reflector (5) has a plurality of continuous surfaces which extend from a first portion on the scintillator material near a first end thereof, to a second portion on the scintillator material near a second opposite end thereof, and continuously extends between said first and second portions.

In regard to claim **51** which is dependent on claim 1, Freund *et al.* also disclose (Figs. 5 and 6) that said preformed reflector (5) has, for each pixel, four completely solid walls, completely surrounding walls of said separated pixel.

6. Claims 2, 4, 12, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of O'Kane Sr. *et al.* (US 2002/0060300) as applied to claim 1 above, and further in view of Such *et al.* (US 2001/0002699).

In regard to claims **2** and **4** (which are dependent on claim 1), claim **12** (which is dependent on claim 1), and claim **19** (which is dependent on claim 1), the modified assembly of Freund *et al.* lacks that the pre-formed reflector is formed of multiple flexible pieces with ridges within said preformed reflector, wherein said inner surfaces of said pre-formed reflector press against outer surfaces of said scintillator material to hold said scintillator material within said preformed reflector with at least one air gap between adjacent scintillator material surfaces by press fitting. Such *et al.* teach (paragraphs 8 and 12; Fig. 2) to press fit scintillator material (23) into a preformed reflector (21, 22) having ridges or protrusions (*i.e.*, spaced apart wire elements; paragraph 9) forming air gaps, in order to manufacture with a high precision and in large numbers at an

acceptable cost. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to form the reflector in the modified assembly of Freund *et al.* from spaced apart wire elements which allows press fitting assembly, in order to manufacture with a high precision and in large numbers at an acceptable cost.

7. Claims 7, 20, 21, 29, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of O'Kane Sr. *et al.* (US 2002/0060300) as applied to claims 1 and 5 above, and further in view of DiFilippo (US 6,078,052).

In regard to claim 7 (which is dependent on claim 5) and claims 20 and 21 (which are dependent on claim 1), the modified assembly of Freund *et al.* lacks a light guide (e.g., a wavelength shifting optical fiber). However, wavelength shifting optical fibers are well known in the art. For example, DiFilippo teaches (column 3, line 21 to column 4, line 8) to provide wavelength shifting optical fibers in order to enhance collection efficiency. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide wavelength shifting optical fibers in the modified assembly of Freund *et al.*, in order to enhance collection efficiency.

In regard to claim 29 (which is dependent on claim 1) and claim 35 (which is dependent on claim 1), the modified assembly of Freund *et al.* lacks an explicit description of specific reflector fillers or additives (e.g., organic optical brightening agents). However, wavelength shifting is well known in the art. For example, DiFilippo teaches (column 3, line 21 to column 4, line 8) to provide wavelength shifting optical fibers (*i.e.*, organic optical brightening agents) in order to enhance collection efficiency.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide organic optical brightening agents (e.g., wavelength shifting optical fibers) in the modified assembly of Freund *et al.*, in order to enhance collection efficiency.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of DiBianca *et al.* (US 4,429,227) and Skillicorn *et al.* (US 5,550,378).

In regard to claim 9, Freund *et al.* disclose (Figs. 5 and 6) a scintillator assembly, comprising:

- (a) a scintillator material (4), having outer surfaces of a first shape; and
- (b) a preformed reflector (5), having inner surfaces which each mate with said first shape to contain said scintillator material (4) at least partly within said pre-formed reflector (5).

The assembly of Freund *et al.* lacks forming at least one air gap between a wall of the reflector and a surface of the scintillator material with a spacer formed by a protrusion that is part of said reflector. However, DiBianca *et al.* teach (column 5, lines 9-34) to provide at least one air gap longer than a wavelength of light between a wall of the reflector and a surface of the scintillator material with a bonding material (100 in Fig. 5), in order to enhance light collection efficiency. Further, Skillicorn *et al.* teach (column 6, lines 12-13) to provide stretched wires to align the placement of scintillator elements. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to form protrusions as a part of the one-part reflector in the assembly of

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Freund *et al.*, in order for accurate placement scintillator elements to obtain air gaps longer than a wavelength of light between scintillator surfaces and reflector walls so as to enhance light collection efficiency.

9. Claims 13, 14, 17, 18, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of O'Kane Sr. *et al.* (US 2002/0060300) as applied to claim 1 above, and further in view of Possin *et al.* (US 6,707,046).

In regard to claims **13** and **50** (which are dependent on claim 1), claim **14** (which is dependent on claim 1), claim **17** (which is dependent on claim 1), and claim **18** (which is dependent on claim 1), the modified assembly of Freund *et al.* lacks that said first shape has an exit window smaller than the area of a face of the pixel upon which each said exit window is defined, wherein said first shape is other than a rectangular parallelepiped with at least one exit face that is not perpendicular to adjacent sidewalls of the material and varies in cross-sectional area in at least one direction by having a first portion at one end which is substantially constant and rectangular in cross section, and having a second end which reduces in area between said substantially constant cross-section and an end section which forms an exit window of the scintillator material. However, scintillator exit windows are well known in the art. For example, Possin *et al.* teach (column 5, line 65 to column 6, line 54) to provide scintillator exit windows smaller than the area of a pixel face so as minimize cross talk. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide

scintillator exit windows smaller than the area of a pixel face in the modified assembly of Freund *et al.*, in order to minimize cross talk.

10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of O'Kane Sr. *et al.* (US 2002/0060300) and Hoffman *et al.* (US 6,087,665).

In regard to claim 16, Freund *et al.* disclose (Figs. 5 and 6) a scintillator assembly, comprising:

- (a) an array of scintillator material comprising plural pixels (4) of separated scintillator material, each having outer surfaces of a first shape, and a bridge (*i.e.*, "base plate"; US 6,894,282 column 4, lines 57-66) holding together the plural separated pixels (4) in a specific geometry; and
- (b) a preformed reflector (5), having plural inner surfaces which each mate with said array of plural separated pixels (4), to contain each of said pixels (4) of scintillator material at least partly within said pre-formed reflector (5).

The assembly of Freund *et al.* lacks that the scintillator material comprises different scintillator materials and an explicit description that the plastic reflector comprises polyethylene. However, Freund *et al.* also disclose (US 6,894,282 column 2, lines 58-65) a plastic reflector. Since Freund *et al.* do not disclose and/or require a specific plastic, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified plastic of Freund *et al.* as any one of the known conventional plastics that would not require further description. Further, O'Kane Sr. *et al.* teach (paragraphs 46-49) that plastics comprise polyethylene. In addition, Hoffman *et al.*

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teach (column 4, lines 28-33) to provide different scintillator materials so as optimize specific detector characteristics. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide different scintillator materials and a known plastic material (e.g., polyethylene) as the unspecified plastic reflector material in the assembly of Freund *et al.*, in order to optimize specific detector characteristics.

11. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of DiBianca *et al.* (US 4,429,227) and Skillicorn *et al.* (US 5,550,378) as applied to claim 9 above, and further in view of DiFilippo (US 6,078,052).

In regard to claims 22 and 23 which are dependent on claim 9, the modified assembly of Freund *et al.* lacks a light guide (e.g., a wavelength shifting optical fiber). However, wavelength shifting optical fibers are well known in the art. For example, DiFilippo teaches (column 3, line 21 to column 4, line 8) to provide wavelength shifting optical fibers in order to enhance collection efficiency. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide wavelength shifting optical fibers in the modified assembly of Freund *et al.*, in order to enhance collection efficiency.

12. Claims 24 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of O'Kane Sr. *et al.* (US 2002/0060300) as applied to claim 1 above, and further in view of Hoffman (US 6,479,824).

In regard to claim **24** (which is dependent on claim 1) and claim **34** (which is dependent on claim 1), the modified assembly of Freund *et al.* lacks an explicit description of specific reflector fillers or additives (*e.g.*, scintillating material). However, additives for scintillator reflectors are well known in the art. For example, Hoffman teaches (column 4, line 55 to column 5, line 2) to provide scintillating material for the reflector fillers or additives so as enhance quantum efficiency. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide scintillator reflector additives (*e.g.*, scintillating material) in the modified assembly of Freund *et al.*, in order to enhance quantum efficiency.

13. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of DiBianca *et al.* (US 4,429,227) and Skillicorn *et al.* (US 5,550,378) as applied to claim 9 above, and further in view of O'Kane Sr. *et al.* (US 2002/0060300).

In regard to claim **25** (which is dependent on claim 9) and claim **26** (which is dependent on claim 9), Freund *et al.* also disclose (US 6,894,282 column 4, lines 10-16) titanium dioxide as an additive to the reflector material. The modified assembly of Freund *et al.* lacks an explicit description that the plastic reflector comprises polyethylene. However, Freund *et al.* further disclose (US 6,894,282 column 2, lines 58-65) a plastic reflector. Since Freund *et al.* do not disclose and/or require a specific plastic, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified plastic of Freund *et al.* as any one of the known conventional plastics that would not require further description. Further, O'Kane Sr. *et al.* teach

(paragraphs 46-49) that plastics comprise polyethylene. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a known plastic material (e.g., polyethylene) as the unspecified plastic reflector material in the modified assembly of Freund *et al.*

14. Claims 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of O'Kane Sr. *et al.* (US 2002/0060300) as applied to claim 1 above, and further in view of Venkataramani *et al.* (US 2002/0181647).

In regard to claims **32** and **33** which are dependent on claim 1, the modified assembly of Freund *et al.* lacks an explicit description of specific reflector fillers or additives (e.g., hafnium or hafnium oxide). However, additives for scintillator reflectors are well known in the art. For example, Venkataramani *et al.* teach (paragraphs 27-31) to provide scintillator reflector additives such as hafnium or hafnium oxide so as to obtain scintillator reflectors having desired x-ray attenuation properties. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide scintillator reflector additives (e.g., hafnium or hafnium oxide) in the modified assembly of Freund *et al.*, in order to obtain a scintillator reflector having desired properties (e.g., attenuation of x-rays).

15. Claims 37, 39-41, 43, 46, 47, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of O'Kane Sr. *et al.* (US 2002/0060300) and Venkataramani *et al.* (US 6,361,735).

In regard to claims **37** and **52**, Freund *et al.* disclose (Figs. 5 and 6) a method, comprising:

- (a) pre-forming a reflector array (5) having plural individual pixels, each of a specified shape having specified shaped inner surfaces; and
- (b) attaching said reflector (5) to an array of scintillator material formed of separated pixels (4) of scintillator material that are held together, each of said separated pixels shaped to fit within one of said individual pixels of said reflector array (5).

The method of Freund *et al.* lacks that said array of scintillator material is a two-dimensional array (e.g., a 4X4 array) and an explicit description that the plastic reflector comprises polyethylene. However, Freund *et al.* also disclose (US 6,894,282 column 2, lines 58-65) a plastic reflector. Since Freund *et al.* do not disclose and/or require a specific plastic, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified plastic of Freund *et al.* as any one of the known conventional plastics that would not require further description. Further, O'Kane Sr. *et al.* teach (paragraphs 46-49) that plastics comprise polyethylene. In addition, Venkataramani *et al.* teach (column 3, line 14 to column 4, line 64) that an array of scintillator material for a CT scanning system can be formed as a one dimension array or a two dimensional array. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to form the array of scintillator material as a two-dimensional array (e.g., a 4X4 array) and to provide a known plastic material (e.g., polyethylene) as the unspecified plastic reflector material in the method of Freund *et al.*, in order to achieve a desired type of CT scanning system.

Applicant is advised that should claim 37 be found allowable, claim 52 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

In regard to claim **39** which is dependent on claim 37, Freund *et al.* also disclose (US 6,894,282 column 4, line 66 to column 5, line 10) an adhesive material, bonding said scintillator material within said pre-formed reflector.

In regard to claims **40** and **41** which are dependent on claim 37, Freund *et al.* also disclose (Figs. 5 and 6) an opening in the preformed reflector (5), at a specified location, corresponding to a specified location on the scintillator material, wherein said opening is at a location of an exit window on the scintillator material.

In regard to claim **43** which is dependent on claim 37, Freund *et al.* also disclose (Figs. 5 and 6) that said reflector (5) has a specified shape to hold said separated pixels of said scintillator material.

In regard to claim **46** which is dependent on claim 37, Freund *et al.* also disclose (US 6,894,282 column 4, lines 10-16) using said reflector to reflect scintillation photons back into said scintillator material.

In regard to claim **47** which is dependent on claim 37, Freund *et al.* also disclose (Figs. 5 and 6) that the preformed reflector (5) has a plurality of continuous surfaces which extend from a first portion on the scintillator material near a first end thereof, to a

second portion on the scintillator material near a second opposite end thereof, and continuously extends between said first and second portions.

16. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of O'Kane Sr. *et al.* (US 2002/0060300) and Venkataramani *et al.* (US 6,361,735) as applied to claim 37 above, and further in view of Such *et al.* (US 2001/0002699).

In regard to claim 38 which is dependent on claim 37, the modified method of Freund *et al.* lacks that the pre-formed reflector is formed of multiple flexible pieces with ridges within said preformed reflector, wherein said inner surfaces of said pre-formed reflector press against outer surfaces of said scintillator material to hold said scintillator material within said preformed reflector with at least one air gap between adjacent scintillator material surfaces by press fitting. Such *et al.* teach (paragraphs 8 and 12; Fig. 2) to press fit scintillator material (23) into a preformed reflector (21, 22) having ridges or protrusions (*i.e.*, spaced apart wire elements; paragraph 9) forming air gaps, in order to manufacture with a high precision and in large numbers at an acceptable cost. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to form the reflector in the modified method of Freund *et al.* from spaced apart wire elements which allows press fitting assembly, in order to manufacture with a high precision and in large numbers at an acceptable cost.

17. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of O'Kane Sr. *et al.* (US 2002/0060300) and

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Venkataramani *et al.* (US 6,361,735) as applied to claim 40 above, and further in view of DiFilippo (US 6,078,052).

In regard to claim **42** which is dependent on claim 40, the modified method of Freund *et al.* lacks a light guide (e.g., a wavelength shifting optical fiber). However, wavelength shifting optical fibers are well known in the art. For example, DiFilippo teaches (column 3, line 21 to column 4, line 8) to provide wavelength shifting optical fibers in order to enhance collection efficiency. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide wavelength shifting optical fibers in the modified method of Freund *et al.*, in order to enhance collection efficiency.

18. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of DiBianca *et al.* (US 4,429,227).

In regard to claim **44**, Freund *et al.* disclose (Figs. 5 and 6) a method, comprising:

- (a) pre-forming a reflector (5) of a specified shape having specified shaped inner surfaces; and
- (b) attaching said reflector (5) to a scintillator material (4) of a shape that fits within said inner surfaces.

The method of Freund *et al.* lacks using one of said inner surfaces of said reflector for forming at least one air gap between adjacent scintillator material surfaces and the reflector. DiBianca *et al.* teach (column 5, lines 9-34) to provide specular reflector comprising an air gap between a reflector wall and a scintillator surface with a bonding

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material (100 in Fig. 5), in order to enhance light collection efficiency. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use one of the reflector inner surfaces for forming an air gap between scintillator material surface and the reflector in the method of Freund *et al.*, in order to enhance light collection efficiency.

19. Claims 48 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund *et al.* (WO 02/25311 A1) in view of O'Kane Sr. *et al.* (US 2002/0060300) as applied to claim 1 above, and further in view of Venkataramani *et al.* (US 6,361,735).

In regard to claims **48** and **49** which are dependent on claim 1, the modified assembly of Freund *et al.* lacks that said array of scintillator material which is held together by said bridge is a two-dimensional array (e.g., a 4X4 array).

Venkataramani *et al.* teach (column 3, line 14 to column 4, line 64) that an array of scintillator material for a CT scanning system can be formed as a one dimension array or a two dimensional array. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to form the array of scintillator material in the modified assembly of Freund *et al.* as a two-dimensional array (e.g., a 4X4 array), in order to achieve a desired type of CT scanning system.

Response to Arguments

20. Applicant's arguments filed 9 April 2007 have been fully considered but they are not persuasive.

Applicant argues (third to last paragraphs on pg. 15 of remarks filed 9 April 2007) that the treating of epoxy resin with titanium oxide as taught by lines 12-14 in column 4

of Freund *et al.* is entirely different than adding titanium oxide as an additive to a polyethylene material as claimed. Examiner respectfully disagrees. Applicant does not provide any evidence or explanation that treating is entirely different than adding titanium oxide as an additive as claimed. On the contrary, Freund *et al.* state (US 6,894,282 column 1, lines 50-53) that the "... scintillator part is encapsulated at its periphery and top side with a reflector coating, e.g. epoxy resin filled with titanium oxide, which serves as an optical reflector" and (US 6,894,282 column 2, lines 58-65) that "In a preferred embodiment of the invention, the reflector part is of one-part design, i.e., unitary or seamless, for example as an injection-molded or die-cast part, which is preferably produced from plastic, in particular a plastic containing an optically reflective filler. ... ". Thus Freund *et al.* expressly teach adding optically reflective filler (e.g., titanium oxide) as an additive as claimed.

Applicant's arguments (second paragraph on pg. 16 of remarks filed 9 April 2007) with respect to amended independent claim 9 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues (last paragraph on pg. 16 of remarks filed 9 April 2007) that the concept of using different materials would be wholly inconsistent with Freund *et al.*'s teaching of forming the materials as one unit such as in Freund *et al.*'s Fig. 4, and then grinding off a portion of the unit after. Examiner respectfully disagrees. Hoffman *et al.* state (column 3, line 58 to column 4, line 6) that "In fabricating scintillator 100, ... First and second layers 104 and 108 may be coupled together in a variety of manners including, for example, bonding, sintering, optical adhesives, optical liquids, or directly grown on each other. ... After coupling first and second layers 104 and 108, scintillator is processed into a detector (not shown) in a manner known in

the art". Thus the scintillator 100 comprising of layers 104 and 108 coupled together is wholly consistent with forming the materials as one unit such as taught for at least one disclosed embodiment (*e.g.*, forming the materials as one unit then grinding off a portion of the unit after as illustrated in Figs. 5 and 6 of Freund *et al.*) of scintillator fabrication.

Applicant argues (first paragraph on pg. 17 of remarks filed 9 April 2007) that claim 37 should be allowable since the pixels can be moved relative to one another as shown in Fig. 4 would not be possible in a two-dimensional array. Examiner respectfully disagrees. Freund *et al.* state (US 6,894,282 column 4, lines 43-49) that the "... As can be seen from FIG. 4, it is possible for a radiation detector according to the invention to be composed of a number of modules, each of which has a reflector part with scintillators, a photodiode arrangement and, if required, a scattered radiation collimator. Such a subdivision into modules affords the advantage, for example, that the individual modules are easy to handle". Thus, Fig. 4 does not show that the pixels can be moved relative to one another. Moreover, there is no reason why the pixels in a two-dimensional array cannot be moved relative to one another. Therefore, applicant's arguments are not persuasive.

Applicant argues (second paragraph on pg. 17 of remarks filed 9 April 2007) that one of the inner surfaces of the reflector is used for forming the air gap as recited in amended claim 44 is in no way taught or suggested by the cited prior art. Examiner respectfully disagrees. DiBianca *et al.* state (column 5, lines 9-34) that "In the preferred embodiment a specular reflector, which comprises an air gap longer than a wavelength of light followed by a highly reflective metallic surface, such as, for example silver or aluminum coated with magnesium fluoride or silicon oxide, is located at the end portions of the scintillator (which face the ceramic sections 30, 31),

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and on the side surfaces of the scintillator (which face the collimator plates). In fact, the ceramic sections (covered with the desired metallic surface) and the collimator plates serve as the reflective surfaces of these reflectors. The face of the scintillator, that is, the surface facing the detector window, is highly polished and may carry a reflective coating, which may be a specular reflector such as, for example, silver, aluminum, gold, or a diffuse reflector such as, for example, magnesium oxide, titanium oxide, barium oxide or the like. The reflector may be either directly deposited or mounted on a thin, X-ray transparent member so as to allow an air gap to be present. Thus, light emitted by the scintillator in response to X-radiation will be directed largely towards the photoresponsive means". Thus DiBianca *et al.* teach to provide at least one air gap between a wall of the reflector and a surface of the scintillator material with a bonding material (100 in Fig. 5), in order to enhance light collection efficiency. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use one of the reflector inner surfaces for forming an air gap between scintillator material surface and the reflector in the method of Freund *et al.*, in order to enhance light collection efficiency.

Conclusion

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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SL


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PRIMARY EXAMINER